Forest Site Management Section
Forest Practices Branch, PO Box 9518, Stn Prov. Govt, Victoria, B.C. V8W 9C2

July 8, 1997

SILVICULTURE NOTE 12

PROGRESS REPORT

SX TRIAL 91-104-Q

FERTILIZATION OF DOUGLAS-FIR (FDC) AT THE TIME OF PLANTING EMORY CREEK, THREE-YEAR RESULTS

Introduction

Fertilization at the time of planting (FAP) has, in many parts of the province, become a routinely prescribed regeneration practice. It is prescribed to deal with a wide variety of perceived limitations to seedling established, including general planting check. This trial examines five different stock types and the effects of one FAP fertilizer treatment on the outplanting performance of Fdc seedlings.

Sites

The Emory Creek test site is located north of Hope in the Chilliwack Forest District (Figure 1). The trial is in the southern variant of the dry, submaritime Coastal Western Hemlock (CWH) biogeoclimatic zone (Table 1). FAP was prescribed for this site as a means of minimizing the effects of vegetation competition. The Emory Creek test site is split between two Site Series. Site 2 is brushier than Site 1 and did not have the amount of browsing that the drier, and more open Site 1 had.

FIGURE 1. Location of Emory Creek FAP trial.

FS 713 HFP 97/6

BRITISH COLUMBIA
Ministry of Forests

106-06498/

TABLE 1. Site conditions for Emory Creek FAP trial

Site conditions and history	
Biogeoclimatic zone	CWHds1
Site series: Site 1	(01) HwFd–Cat's-tail moss
Site series: Site 2	(04) Fd–Fairybells
Moisture/Nutrient regime: Site 1	3–4/C
Moisture/ Nutrient regime: Site 2	2–3/B-C
Logged	1986
Site preperation	1986
Planted	1991

Species and Stock Type

There are five stock types of the same seedlot of Fdc used in the trial (Table 2). With the exception of the "hot-lift" BR stock type, all other stock types were frozen stored and thawed before planting in the spring of 1990. At planting, the bareroot stock types were twice as large as the container stock types.

TABLE 2. Stock type combinations used in Emory Creek FAP trial

Species	Seedlot	Stock type	Height at planting
Fdc	1275	PSB 313B 1+0	28 cm
Fdc	1275	PSB 415B 1+0	28 cm
Fdc	1275	PSB 415D 1+0	22 cm
Fdc	1275	BR 2+0	52 cm
Fdc	1275	BR 2+0 Hot lift	58 cm

Hot-planting, particularly for BR stock, is regarded as another method of avoiding planting check.

Treatments

There was only one FAP treatment used at Emory Creek (Table 3).

TABLE 3. FAP treatment used in Emory Creek FAP trial

Treatment	Formulation	Duration (month)	Fertilizer rate (g/tree)	N rate (g N/tree)
Control				
GROMAX #2™	12-5-8	24	5.0	0.60

The rate of N applied is considerably less than the 32 g N/seedlings that is normally prescribed as a broadcast, surface application. GROMAX #2™ is an ammonia-rich N-source that releases its contents by rupturing rather than dissolving. The fertilizer is blended with a hydrophilic gel to enhance the water supply available to the seedling. The duration of the fertilizer release is rated as 24-months for a specific combinations of soil moisture and temperature. The expected duration of release is determined under laboratory conditions for specific temperatures and moisture content. Given the cool soil temperatures and site conditions, it is possible that the fertilizer may last longer on the site than under the standard release conditions quoted by the manufacturer.

Results

The first-year plantation height growth was, across all stock types and FAP treatment combinations, less than 10 cm.

Survival

There were large, statistically significant differences in survival between unfertilized and FAP treatments for all stock types (Figure 2). The high mortality was due to browsing. The fertilized seedlings were selectively browsed by deer and rodents during the first year after planting. The hot-planted bareroot stock type was the most severely browsed of any stock type, an observation consistent with the preferential browsing by rabbits of hot-planted Pl in northern B.C. The effect was evident on both sites, with the unfertilized 2+0 BR and PSB 415D 1+0 stock types having the acceptable survival. An interesting trend at both sites is that there is a clear browse preference for the size of the seedling — larger seedlings are preferred to smaller seedlings. There was minimal browsing during the second growing season.

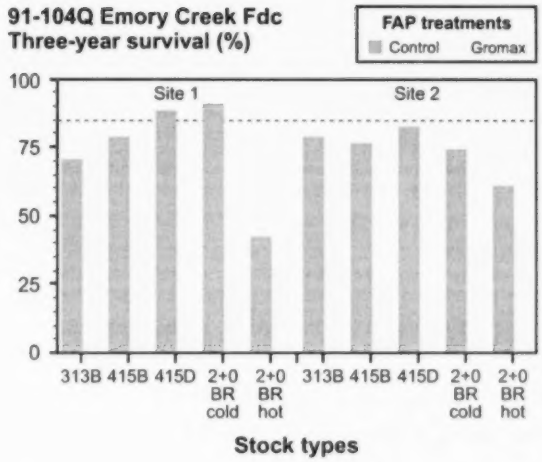

FIGURE 2. Third-year survival for different stock type/treatment combinations for Emory Creek FAP trial. The horizontal line at 85% is a reference line of silviculturally acceptable survival.

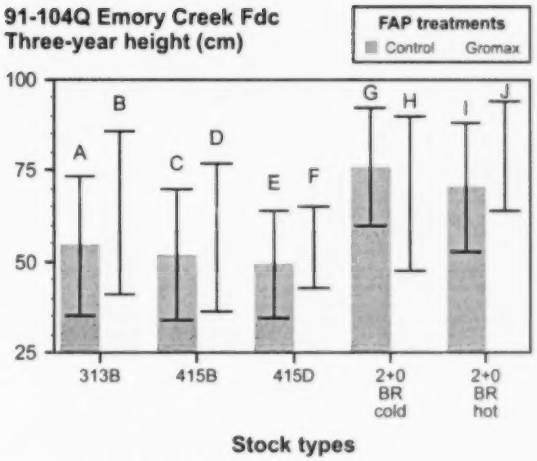

FIGURE 3. Third-year total height growth and standard error of the mean for different stock type FAS treatment combinations at Emory Creek. Treatment means marked with the same letter are not considered statistically significantly different at a probability of 5%. The error bar about the mean two-year height is the standard error of the mean. Sites have been pooled because there was no statistically significant difference in height growth.

Height Growth

The height growth results clearly indicate that there was pronounced planting check of the BR 2+0 stock type whether it was cold- or hot-planted. Generally, the FAP treatment resulted in seedlings growing 5 to 10 cm larger than the unfertilized seedlings of the same stock type in the first two years (Figure 3). These height growth differences are considered statistically significant. The effect of fertilization is evident in both the first- and second-year increments. FAP treatments tended to be more variable than the unfertilized controls due to a combination of inconsistencies in the placement of the fertilizer and the browsing damage.

Conclusions and Recommendations

Although FAP may have had some effect in minimizing planting check and improving growth for the first two years, it also resulted in an unacceptable degree of browsing. FAP can not be recommended in areas with high browsing potential. It is expected that the height difference will continue to persist for a number of years, but there will be no further effect on annual increment. The trial will be assessed in 1996 to determine whether these effects have persisted and what their impact may be on achieving free growing status.